

REMARKS

This is in response to the Office Action mailed on September 9, 2004. No claims are amended, no claims are canceled, and no claims are added; as a result, claims 1, 2, 4-10, 14-16, 18-21, 24-27, 29-36, 38, 39, 41-57, 59-66, 69-75, 77-80, 82-88, and 90-92 are now pending in this application.

§102 Rejection of the Claims

Claims 1, 6, 51, 55, and 77 were rejected under 35 USC § 102(b) as being anticipated by Dion et al. (U.S. 3,943,666). Dependent claim 57 is not mentioned in the Office Action, but is argued herein for complete responsiveness. Applicant respectfully traverses this rejection.

The latest office action does not address Applicant's request to indicate where in the cited reference teachings as to the "rigid polishing pad" may be found, and merely restates the prior rejection. Applicant again respectfully requests that Examiner provide some indication of the location of such teachings in the cited reference pursuant to 37 C.F.R. 1.104(a)(2) so that Applicant may judge the propriety of continuing prosecution of the claims.

Applicant again submits that the cited reference of Dion does not refer to the recited feature of a "*rigid polishing pad*", as recited in the present independent claims 1, 51 and 77. Additionally, the Dion reference relates disclosing a polishing system having a rotating platen 10 in contact with a rotating abrasive element 30, typically formed of alumina. See column 3, line 46 to column 4, line 5. Applicant is unable to find linear motion of the polishing pad or disk relative to one another during the polishing process. The "... broken lines 33 is provided to enable element 30 to be placed in pressure contact with disc 10 during burnishing and to be withdrawn from the surface of disc 10 a sufficient distance to permit removal of disc 10 after burnishing...", and one of ordinary skill in the art would understand that there is no possibility of any linear motion of either portion of the apparatus since the washer 25 and large screw head 26 would destroy the brittle abrasive element 30, thus depriving the invention of its essential purpose.

Specifically, independent claim 1 recites "...a *rigid polishing pad*, wherein the polishing pad drum is adapted to rotate about the axis of rotation along the drum length, and wherein at least one of the polishing pad drum and the platen are adapted to be linearly moved with respect

to the other ...”, which combination of features Applicant submits is not found in the cited reference of Dion. Applicant is unable to find, in the cited reference, a “*rigid polishing pad*” or linear motion between the disc 10 and the abrasive element 30 during the process. Additionally, Applicant notes that it appears that the Dion reference would not be operable with linear motion between the disc and the abrasive element during the process. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Specifically, dependent claim 6 recites “...*polishing pad drum is embedded with a polishing abrasive...*”, which claimed feature is not found in Dion. The cited Dion reference discloses burnishing using an alumina, diamond, granite, ruby, etc. rotating cylindrical surface having specific surface finishes. Applicant can not find either a polishing pad or a polishing abrasive embedded in a pad in the cited reference. Claim 6 is additionally seen as being patentably distinct over the cited reference as depending from an independent claim shown above to be patentable over the reference. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Specifically, dependent claim 8, which was not discussed in the present Office Action, but was rejected in the previous Office Action as stated in paragraph 4 of the present Office Action, recites “...*wherein the length of the polishing pad drum spans across the wafer to polish the wafer in one pass...*”, which claimed feature is not found in Dion. Dion relates to an apparatus that has a drum that covers less than half the disc 10, and uses many rotations of the disc 10 to complete the polishing.

Specifically, independent claim 51 recites “... *creating a linear movement between the polishing pad drum and the platen to polish the wafer ...*”, which claimed feature is not found in Dion. As discussed above, Dion relates to a system where both the disc 10 and the abrasive element 30 are both rotating, and have no linear movement between the polishing pad drum and the platen *to polish the wafer*. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Specifically, dependent claim 55 and dependent claim 57, which is not mentioned in the outstanding Office Action, respectively recite “...*controlling a linear speed of the platen...*”, and “...*controlling a linear speed of the drum...*”, which claimed features are not found in Dion. As discussed above, Applicant is unable to find in Dion a system with relative linear motion during

the polishing operation, but rather has only found rotary motion. Claims 55 and 57 are additionally seen as being patentable over the cited reference as depending from an independent claim shown above to be patentably distinct over the reference. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Specifically, independent claim 77 recites “... *creating a linear movement between the polishing pad drum and the platen to polish the wafer using the embedded polishing abrasive* ...”. which claimed feature is not found in Dion. As discussed above, Dion relates to a system where both the disc 10 and the abrasive element 30 are both rotating, and have no linear movement between the polishing pad drum and the platen. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

§103 Rejection of the Claims

Claims 1, 2, 4-9, 14, 16, 18-21, 24, 25, 33, 35, 36, 38, 39, 41-56, 59-61, 63-66, 69-75, 77-80, 82-88, and 90-92 were rejected under 35 USC § 103(a) as being unpatentable over Shimizu (U.S. 5,827,115) in view of Dion et al. (U.S. 3,943,666), as set forth in the Office Action mailed April 20, 2004. Applicant respectfully traverses this rejection.

Applicant respectfully submits that the cited reference does not disclose polishing “the wafer in one pass”, as stated in the Office Action in paragraph 6. Shimizu appears to disclose a rotation of the wafer 9 and a “reciprocation” (see abstract; col. 3, lines 2, 14, 26 and 61; col. 4, line 24; and figures 2 and 3) of the drum and pad 16, which one of ordinary skill in the art would understand to mean multiple passes of any particular portion of the wafer 9 under the polishing drum and pad 16. Further, Shimizu states at column 7 lines 4-5 that “...when the number of strokes of the reciprocating motion is increased to obtain a specific amount of polishing polishing irregularity of each stroke can be reduced ...”. Clearly the cited reference of Shimizu discloses and suggests an arrangement where there are many passes of the reciprocating polishing drum over the wafer. Thus one of ordinary skill would understand that the cited reference of Shimizu does not describe or suggest a polishing process that has only “one pass”, as found in the present claims. Therefore, Applicant respectfully submits that the Examiner is incorrect in stating that the cited reference discloses polishing in one pass, and thus the cited

reference, whether taken alone or in combination with the cited reference of Dion, does not disclose at least the recited feature of claims 8, 20, 52, 63, 73 and 78, to “... *polish the wafer in one pass...*”.

Applicant respectfully submits that the Office Action has admitted that the cited reference of Shimizu does not disclose a “*rigid polishing pad*” (see paragraph 5 of the Office Action dated 4/20/2004) as recited in independent claims 1, 14, 33, 45, 47, 49, 51, 61, 72, 77, 82 and 90. Applicant has discussed above that the cited reference of Dion does not disclose a polishing pad at all, but rather an abrasive cylinder or truncated cone. Thus Applicant submits that the combination of Dion with Shimizu, even if allowable, still does not contain or suggest at least the combination of features of a single pass polishing process having a *rigid polishing pad*.

Further, Applicant submits that the suggestion in the Office Action at paragraph 6 that the Dion reference discloses “to throw debris in a direction toward a previously processed portion of the wafer” is incorrect. The indicated figure 1 does not show anything regarding polishing a wafer, and the only figure in the cited reference that does show polishing of a disk, figure 3, shows that the abrasive drum 30 rotates so as to throw debris against the motion of the disc 10, and thus not “toward a previously processed portion of the wafer”, as claimed, but rather towards the portion of the wafer that will be polished next. Thus the cited reference discloses an arrangement that will create a problem that the claimed arrangement corrects, as recited in claims 8, 20, 26, 52, 63, 73 and 78. Further, Applicant submits that a reference such as Dion, referring to the burnishing of plastic recordings, is not an appropriate reference to combine with Shimizu’s semiconductor process since they are not from the same art, and thus the suggested combination fails to provide motivation for one of ordinary skill in the relevant art to make the suggested combination. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Claims 10, 15, 26-27, 29-32, 34, and 62 were rejected under 35 USC § 103(a) as being unpatentable over Shimizu (U.S. 5,827,115) in view of Dion et al. (U.S. 3,943,666), and further in view of Bruxvoort et al. (U.S. 5,958,794), as set forth in the Office Action mailed April 20, 2004. Applicant respectfully traverses this rejection.

Applicant respectfully submits that the Office Action is incorrect in stating that the Dion reference discloses throwing “debris in a direction toward a previously processed portion of the

wafer". As noted above with reference to the previous rejection, the Dion reference shows in figure 3 that the abrasive drum 30 rotates so as to throw debris against the direction of motion of the disc 10, and thus not "toward a previously processed portion of the wafer", as recited.

Further, the Shimizu reference does not disclose polishing the wafer in one pass. Shimizu refers to rotation of the wafer and reciprocation of the drum, which one of ordinary skill in the art would understand to mean multiple passes of any particular portion of the wafer 9 under the polishing drum and pad 16. The cited reference of Bruxvoort is used in the Office Action to show that a laser may be used to dress polishing pads. Applicant submits that the Bruxvoort reference does nothing to cure the above noted failures of the Dion and Shimizu combination to describe or suggest polishing the wafer in one pass, or throwing debris against the motion of the wafer. Thus, Applicant submits that the suggested combination of references, even if allowable, still does not contain at least the above noted combination of claimed features.

Specifically, the suggested combination of references, whether taken alone or in any combination, fails to describe or suggest at least the claimed feature of a "...*polishing pad drum being formed by a rigid polishing pad* ...", as recited in independent claims 1, 14, 26, 33 and 61 from which dependent claims 10, 14, 27, 29-32, 34 and 62 respectively depend. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6960 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

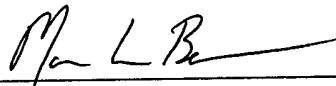
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 17 day of November, 2004.

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